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Title word cross-reference

3 [CC18, SLW10]. Q [Gao20].
-D [SLW10]. -Sorting [Gao20].

1 [SYOL07]. 11th [ES09, FT05]. 11th-graders [ES09]. 12
[LFM+19, MHIS09, OBH17]. 15 [LGS18a, LGS18b]. 15-year-old [MR14].
15/16 [DAM19]. 15/16-Year-Old [DAM19]. 16-Year-Old [DAM19].


3-Year [HNMG16, BW10].
[AO16, BSA+14, BB17, BSD13, DHB19, ES16, Jaf20, JSP15, Lep12, SLC17, YL18, YWC+18, AW12, GGSP10, WCT+12]. **Assessment**

[ALT+07, AK20, CGR17, DJB15, EA19, GPCB15, MSGGVZDF20, jK19, LL06, MMA05, PP08, PB19, SAA18, SLZ20, WC16, ZV18, CCN+12, Chi12h, CMME15, CJOCl1, GDSSD10, KBY11, Lin06, RB13, Şah10, WHA14]. **Assessments**

[LCA16, MDF08, Saf18, GCS10, WSL14]. **Associated**

[LCA16, MDFO8, Saf18, GCS10, WLSL14]. **Assessments**

[CC05, KBH+15, VC17, NFK10]. **Assessments**

[LCA16, MDF08, Saf18, GCS10, WSL14]. **Associativity**

[AK17a]. **Astronomy**

[Rol19]. **asymptote**

[Kid11]. **Atayal**

[CLY10, HL13]. **Atmosphere**

[LAN20]. **attachment**

[Kuw13]. **Attainment**

[IAS17, Ing14, Wel15]. **Attempt**

[AH11]. **Attempts**

[Bla04, IK18]. **Attention**

[Wil20]. **Attitude**

[CO18, HCH16, SK17, SWAEKS19, Rut11, Tig14]. **Attitudes**

[AAF17, L16, LHC17, MNBZH+05, MDF05, SAAl8, SF05, Su08, TKDD19, BSLM16, BW10, CPMSW11, CBDV10, HGK11, HY05, KB16b, KB17, KSE16, LY10, LH16, PSC+13, Uit14, WT15, Zei10]. **Audit**

[Oa06]. **Australia**

[MP10, VC17]. **Authentic**

[CC05, G04, Koh19, Ron18]. **Authenticity**

[Lil07]. **authored**

[HBTP13]. **Authors**

[Ano03a, Ano04a, Ano04b]. **autonomy**

[BK13a]. **Availability**

[WM17]. **Avoiding**

[SBS+07]. **Awareness**

[EB20, Ron20, CBDV10, Web13].

B [Ron20, VT07a]. **Back** [Lee16b]. **Background** [TKDD19]. **Balance**

[HA07, WMS13]. **balanced** [KTBG15]. **ball** [Lee11]. **Bangladeshi** [SC14]. **barriers** [TT14]. **base** [DW15, KYA13a, ODC09, RCT+11]. **Based**

[AOZ09, AMG16, BKW+19, BKC15, BF19, DLD18, Dud17, DJB15, KD09, KBH+15, KKS+19, KC20, KL18b, KKL20, KLH15, KEET17, KTC19, Leu19, Lil07, Lin05b, LLC+15, MSA17, McG03, MM05, NvK+18, Own06, QVS17, SLCK19, SJL20, TAC19, TYS17, TKS18, UD18, VB20, WO19, YWC+18, Als12, AT15, B19, CTT+11, Che08, CKH15, Din14, FG14, FD12, GACZ09, HCC15, HTWT14, KIR12, KB16b, Kuw13, LM15, LB08, LTT06, MSH10, MMV16, NEAC10, NKR+18, Oh11, Oh14, Oli10, Ols07, OZM12, Ouw10, RCG+11, SCS+12, WWTC10, YFL15, Yik14, ZKS+05, vA06]. **Bases**

[FT05, ODTS07, JLCT12]. **Basic** [WT20, Kaz14, STC12]. **Basic**

[NPT17]. **Basque** [MG15a]. **be** [DCFC16, SC11]. **Becoming** [jK19]. **Before**

[BBT17, KLJ+13]. **Beginning**

[BHD+15, AV06, AE15, BK13a, Cha10, DW15]. **behavior**

[BRMMH15, ModBB12]. **Behavioral** [HCH16, S118a, BSLM16]. **behaviors**

[APCK12, HY05, KSE16]. **behind** [GLY09]. **Being**

[WHC17, YKC18, BNH+15]. **Beliefs**

[AAMU+14, AMG16, BHD+15, FCS15, MSGGVZDF20, JSS17, Jao17, KKE+17, LR20, LL18, MHS09, PS017, PN04, SCC+19, SAA18, Sum13, VCSW20, Vid15, WL18, AAS13, Bur10, CVVCV11, CDT+11, Gok12, KSE16, Liu09, L111, ME13, QM14, RJJB12, Šap13, Top13, Uit14, YHT16]. **Belongs**

[VWH+17]. **Benignments** [LLC+15]. **Benefits** [Dah17, Bes11a, Bes11b].
[BC06, BHD+15, ÇAC07, CB16, EG17, HA07, HFVH17, LR20, MC04, MQ07, YY13, BPG11, BEF15, BMN16, ÇAC09, OS10, OdC15, PYR+12, RVG15].

Changed [FI19, KHL12]. Changes
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[Yeo17a, Yeo17b].

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characters [Che11].

Charting [Lee18]. Chemical
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chemistry-learning [BSA+14]. Childhood
[AM17, Lee16a, TOV12]. Children [AV16, CWMH19, EA19, Güv09, Hua17, KRT11, MF06, SBN16, So03, SK17, VWH+17, WwL+15, Bra12, BVDV13, Can14, Che11, Ch12b, Fer14, HPP09, HY05, LCC11b, SBN14, PP18].

Chile [THV+15, TLHV16a, TLHV16b]. Chilean [GS16, SCG+19].

China [ZC15, JHWW16, WB20, WO19, WH15, ZKS+05, ZF06].

Chinese [BVDV13, CW06, CJ17, CL10, CVCC11, Che11, Din18, Gao20, HFV14, JC10, JW15, KL18a, Len06, LLM+18, LP11, LH16, MLK+15, NLS08, Ng10, RXLC16, ZBL+16, ZS11, ZV18].

Choice
[BB17, JCC20, PD17, Sas19, BS15, LLWS13, Web13]. Choosing [DAM19].

Christian [BdSSC16]. circle [Aky16]. Circuits
[CK06, Lin16a, KTMBG15, SY14]. Circulatory [Wan04]. citation [WTC+16].

CiteSpace [TYW+17]. Citizens [KKL20]. Citizenship [Alg20].

CK [OBF15]. claims [AV06]. Class
[MSdSG15, OE19, CMEM15, KYJS12, LLL15, MMZ09, SMVE15, WT15].

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[And03, BE16, Bla04, DS18a, DKL16, EHM19, EH18, GHS+18, IK18, LTT+19, Leu05, Leu19, MHS09, MSAGHM19, MBBRO8, MF05, NLS08, OS10, PP15, PCL18, Sch14, Sh18, SF05, SGHM15, SGHM16, TM17, TA15, VJ06, WQNC17, YS06, AV06, Ale14, CK14, CL10, CYK+16, Fos15, GLY09, HL13, KTMBG5, Lee11, Oh11, PDG15, Pap10, Pet13, QM14, RB13, SIS+11].

Classrooms
[FHM18, HNMG16, HNMM16, HKS18, KFM+17, LFF03, MD13, NvKr+18, NKT+18, NPT17, OS05, RL19, Sea16, SGHM15, SGHM16, SZM06, WHH08, AAF12, AH11, CCN+12, FG14, Kau11, LCC11b, NCH11, NKR13, Oli10, PYR+12, SYO05, SYO17, SIS+11, TRF05].

Climate [HFVH17, BEF15, CK14, Pet13]. clinical [WMS13].

clock [BVDV13]. clock-reading [BVDV13]. Cluster [FB19, NLW16]. Co
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[TWC+16]. co-taught [MMZ09]. Coeducational [DS18b, SCB16].
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[ASR19, BPG11, ÇAC07, CB16, EG17, FB19, HA07, Hua17, JLC17, KÇ18, MZC+19, MC04, MQ07, SV08, SMPK+19, SP17, SL17, SF05, TT07, TS04, WT18, APCK12, BHSC10, ÇAC09, Eme09, Gok12, JW15, Lep12, NPR12, OBE12, PYR+12, SW14, TOV12, vA06].


Concerning [CC05, CTC14]. Concerns [LE06, HY05]. Content [APR+17, CCW16, DK18, DRZ20, DJB15, EG17, HYC+16, KR18b, Kul18, LTM18, LTCCY07, MS18, RB09, SGHM15, SGHM16, TCH+17, YCH04, CTGS15, ELY15, FG14, Hsi13, ZB13].

Consideration [JLC+13]. Considerations [YAC10]. Considered [Sum16b].


[AGBC17, CYT16, DNWC18, EG17, GOLD19, GFCG18, HNAA16, KKS+19, KA19, Mea07, QVST17, SS19, TKDD19, Vid15, Wi20, ZG08, BEF15, Bes11a, Bes11b, BRMN15, CSM12, DK10, MDT13, UKM11, VRW05, YFL15].

Context-Based [KKS+19, YFL15]. Context-Rich [EGJ09]. Contexts [BTJA18, Jon19, LFM+19, SLZ+18, WT20, GS12, KST09, KYJS12].


Contribution [LY07, OS18]. control [BES12]. Controversial [YZK15].

coordinate [CMME15]. Cooperative
[AT07, CB16, EG17, KWO07, Ebr12, PCL18]. Coordinates [SVDK09].

Coordinating [CCT16]. Coping [PSB19, OS10, SP15]. Core [SCS19].

Correction [HCBS18, LGS18a, LGS18b]. correlation [LLT09].

Correlations [ES09, SP05]. correlative [LCC11b]. Countertuitive
[BE17]. counting [BC11]. Countries
[HLT18, Wat17, BSD13, CRR09, Chi12a, WOB12]. Country [MG15a].
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[Chi09, Mer07, LLL15]. Creativity [AAAB16, HK10]. credibility [AB11].
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CTC14, EGT16, KYA13c, ME13, TOV12, TCC+10]. Cross-Age
[KH15, YYC04, CTC14]. Cross-Cultural [KL18b, MLK+15]. Cross-Grade
[Din18]. cross-level [ME13]. Cross-National
[KYA13b, EGT16, KYA13c, TOV12, TCC+10]. crossing [Hob13]. Cultural
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PZLR16, TSA12, Tan11, VRW05, WLSC09]. Cuts [HTCS19]. Cycle
[GOMLS18, ACY10, GDSD10]. Czech [KV10].

D [CC18, SLW10]. D-Printing [CC18]. Daily [MSAGHMNG19]. Danish
[DK10]. DAST [MJMR11]. DAST-C [MJMR11]. Data
[JCC20, TH19, TT18, WL18, Che14, CP12, CMME15, LH15]. Datasets
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[Dah17, PMCG+17, Kd11, SG15, WCY16]. Definitions [Dah17]. Defuses
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[AM04, WSA07]. Delphi [WB20]. Delta [TDBLY16]. Demands
[FN18, PB19, SCS+12, TT18]. Democracy [KKE+17]. Democratic
[DS18a]. Demographic [ES09, AI18, Last13]. department [Me10].
Dependent [TLHV16a, TLHV16b, WCY16]. depth [VR12]. derivative
[AU15, GLSM11, SMFL15]. derivatives [MMR15]. Derived [BB17, CYT16].


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[HBTP13, So16]. extra-curricular [So16]. extracurricular [BMN16].
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[PP19]. Facilitating [Che08, Dud17, LLT+20]. Facilitator [RAL+07].
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[AK13, AE16, CS16, FH13, Giv09, HGSL18, JCC20, PCL18, SI18a, WHH08,
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Field [LR20, Hob13, MG15b]. fields [GACZ09]. Fifth
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[JLU+10, KLI+13, SLZ+18, THV+15, TLHV16a, TLHV16b]. First
[ACY10, Are12, Bla04, CABR06, Dah17, DC06, Kön13, PFFG+18, RCG+11,
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[CABR06, Dah17, DC06, SS19, Vid15, AC15, NEAC10]. Five [ES09].
fixations [AM14b]. Flemish [BVDV13]. Flexibility [DGEP16]. Flipped
[WQNC17]. Floating [SLC17]. Florida [HFVH17]. Flow [HHT+20, RG20].
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[LH14, LS15]. Fractions [KR18b, PUR18, Saf18, SP17, SP15]. Framework
[CMP19, GPR+18, MC04, VT07b, YL18, Yeo17a, Yeo17b, CBO09, Nyi15,
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functioning [BSD13]. Functions [AWL16, DNV17, EPEG07, AGB14, DVV15, FH12, Lin14a, MMP14, NFB+15, WLSL14]. Fundamental [ABPV20, CYT16], funds [CJOCl1]. Future [ABH17, GSJ+17, LK18b, SI18a, YAC10, vdWBD17, HWW13, Las13, WT13, WMP+12].


Having [HC16a]. Hawai‘i [Kuw13]. Hawaiian [Kuw13]. hazard [BHS15].
**Integrated** [BB19, Cor17, GT19, HGSL18, Su08, TKDD19, BW10, KB17, VRW05, WCG09]. **Integrates** [MF05]. **Integrating** [BJ10, LW18, RV17, VB20]. **Integration** [BB19, EK19, HY07, JLC17, Saf18, BW10, CS15, DFR06], **integrative** [KG15]. **Intellective** [EHM19]. **Intellectual** [TWC17, JLC17, Saf18, BW10, CS15, DFR06]. **Intensive** [HNB11, MW09]. **Intention** [HCH16, LW16]. **Intensions** [AMG16, PUR18]. **interaction** [AH11]. **interactional** [RB13]. **Interactions** [ABH17, GHS+18, SLZ20, SGHM15, SGHM16, YKUB17, KST09]. **Interactive** [TA15, OL14]. **Interactivity** [AVT16]. **Intercultural** [CMP19]. **Interdependency** [KL18b]. **Interdisciplinary** [YHL18]. **Interest** [KKS+19, KRU19, SLL+20, Uit14, LAMV12, RSPK14]. **Interpret** [LKC+15, SS18]. **Interpretation** [CP17, OC08, PUR18, WJ07, AR10]. **Interpretations** [WS16]. **Interpreting** [GT19, Sha06, YKUB17]. **Intervals** [GFCG18]. **Intervention** [LKC+15, SMPK+19, Yan03, BZST10]. **Interventions** [Hua17]. **Interview** [JHWW16, WMS13]. **Interviews** [LLT09, WHA14]. **introducing** [GACZ09]. **Introduction** [Ano12d, Ano13, BHS13, FHM18, LGS17b, LGS18b, YPT07a, RR11]. **Introductory** [BCC06, Din14, SVME15]. **Intuitional** [Giv09]. **Intuitive** [BBST06, EK18, Ron20, SBT+06, Bab10, BES12, PMLC15]. **Invalid** [DB17]. **Invention** [WJ07]. **Inventory** [SV08, HBSC10, Ful15, LH16]. **inverse** [DV15]. **Investigate** [CC05, LJ16, LL05]. **Investigating** [AAF17, ÇAC09, CT18, CABR06, DK15, DNWC18, KAC15, MPB10, OBF15, Sty08, Sum16b, TYC17, WWTC10, WMS13, Wil20, YKC18, PK15]. **Investigation** [DB17, FB06, HBCS18, HCI18, Liu05, OS05, OBH17, TLo17, TT18, WT20, WCC10, YSH19, rSY19, CVCV11, Gok15, JW15]. **Investigations** [CWW11, So03, vA06]. **Investigative** [MH17]. **Involved** [AM04]. **Involving** [RB09, RH19, WK09, JW15, LS15]. **Ions** [BP12]. **iPod** [LJ16]. **iPads** [HI18]. **Ireland** [GCS10]. **irregular** [Pap10]. **Island** [BSA+14, TVC03, SC03]. **isolated** [BSA+14]. **Israel** [HCBB03, HEB11, MNE12]. **Israeli** [BRMNHH15, DE15]. **Issue** [Ano12d, Ano13, BKC15, Cor17, LGS17b, LGS18b, SBS+07, BHS13, HIS+16, HISH16, RR09]. **Issues** [JHWW16, KR18a, KKL20, LB08, Sas19, Sea16, TSC17, YZK15, YJO, CYC+16, CYC+16, CYOC11, HEB11, LM10]. **Item** [Lee18, YCH04, HBSC10, BSD13]. **Items** [KLH15, PB19, DL12].

**J** [HL07, LGS18a, LGS18b]. **Jakarta** [RL19]. **Japanese** [Kni10, MOI07, RK10, SBS+07, UM18]. **Jewish** [EHM19]. **Johannesburg** [Kyl06]. **joined** [MNE12]. **Jordan** [AAMU+14].
Journal [Ano12a, Ano12b, HL07, SYOL07, VT07a]. Journaling [Li07].
Justifications [DE15, LL05].

Kenya [Bag11, GN08, KWO07, KB16a]. key [Che12]. kindergarten [HFWY14, TM17]. kinetic [TCC+10]. know [AB14]. Knowing [AVM16, RB13]. Knowledge [ASR19, APR+17, BHD+15, CCW16, CO18, CEB12, DRZ20, DJB15, EVV11, ES04, FL06, Gub16, HTCS19, HNAA16, HE17, HFVH17, Hua06, KR18b, KB16a, KÇ18, KLH15, Koh19, KBK15, Ku18, LL06, LTM18, LTCCY07, LY07, LK18a, MQ07, PL19b, Sa18, SMG+19, SB09, TBP17, TCH+17, UE19, WCC19, YAC10, vV16, AW12, BSD13, CJOc11, DFR06, DW15, ELY15, Emc09, HTWT14, Hsi13, HY05, HL07, JLCT12, Kid11, KRT11, Kön13, KV10, Las13, LH14, LCC+09, Lin14a, Lui13, Maj14, Nyi15, OBE12, WLSN14, Wai14, WWTC10, Web13, Yik14, ZB13]. Knowledge-Integration [Saf18].

Kong [Che14, FHMl18, Hol0, KFM+17, LM15, So03, WQ19, YCH04, YT07, ZBL+16, ZL12]. Korea [KYJS12, SB14, SBN16]. Korean [CMP19, HK10, JMS16, KB17, LFF03, Lee11, MLK+15, OS05, PL19a].

Kosovar [ETG16]. Kuwait [Ebr12]. Kuwai ti [AR10, Al16, AMG16, Jaf20].

Lab [TSMW16]. laboratories [BJ10]. Laboratory [CT17, CHC16, Che08, KD09, KH08, LLW+20, TYW+17, BRMNH15, DMNH11, KIR12, Mas15, MIJJ15, ODC09]. laboratory-based [KIR12].

Lakatosian [Oh11]. Language [BF19, CGR17, GHS+18, HNMG16, Hua06, HILAT16, Kw07, PB09, SMK+19, Sea16, WS16, Ale14, DBS15, GGS010, HL07, IK14, OO15].


learned [Ho10]. Learner [Ene09, OÇ08, SP05, TT07, AB13, FL11].

Learners [Ble09, GHS+18, HILAT16, NLS08, PB09, Ale14, BL09, WD12]. Learning [AT07, AYW16, ALT14, AM04, AK17b, ABG06, BMN16, BTJA18, CGERBL18, CT16, CB16, CP17, CCCN17, CHC16, CWLH19, CCWL15, CC18, CMP19, CABR06, Cor18, CT04, Dhi08, DL12, DLD18, DJB15, EN08, EG17, FCS15, FT05, FB06, FML18, GGD15a, GSO+17, GHP07, GRWHP19, HA07, HNMG16, HE17, Hwe04, HMS16, IAS17, IFL20, JSH+19, KL18a, KKS+19, KP18, K19, KEET17, KTC19, LEO6, LL06, LB08, LLW+20, LKC+15, LZL+18, LM10, MNBZH+05, MSA17, MDF08, MZC+19, MVC17b, MBBR08, NLW16, Own06, Own10, PS017, PP08, PH18, RGC08, Rol19, Sa18, SBM12, Shi18, SLCK19, So03, SZCL18, SLJ20,

Malaysia [IA08, KIR12]. Malaysian [BFH19, LP11]. Male [BG17, WT15]. Management [SGHM15, SGHM16, BHO14]. Manifest [AI18]. Manipulative [UE19, UFW17]. Manipulatives [WT18, LY10]. Manipulative [Oh11]. Mapping [BCC06, JW15, KWO07, VWH17, LTT09, ÓDC09]. Mastery [CWW11]. Match [SLCK19]. Materials [KP18, Sty08, OS10]. Math [BB19, LGS18a, LGS18b, PZA16, SLZ20, SK17, UM18, WlCC18, YKJ20, BJ10, DE15, KKvdW15, KB14, Lee16a]. Math/Science [WlCC18]. Mathematically [LTT06, LG13]. mathematically-talented [LG13]. Mathematicians [AC20, ARZRV16]. Mathematics [AN18, AVM16, AC20, AVT16, ABPD16, ALT07, ALT14, ABPV20, Ano03, Ano12a, Ano12b, Ari18, Ari9, AE10, BFH19, Ber19, CJ17, CTC16, CCCN17, CC16, Cor18, Cor17, Ded11, DRZ20, DB17, Dog12, Dog16, DNWC18, DKL16, DJE17, DJB15, EHM19, Ekb19, ES08, ERC03, FCS15, FWT18, FI19, FB06, GG09, GPC15, GSI17, Güv09, HTCS19, HKS18, Hint18, HLT18, HLo7, MSGGVZF20, IA08, JLO18, Jao17, JMS16, Kau11, Kili18, KLH15, Koi10, KBK15, KRU19, Kot16, LAN20, LR20, LJ16, LOJ08, LHC17, Len06, LTT19, Ler07, Leu05, Leu19, LTCCY07, Lin05b, LW16, Lin17, Lui13, LKi18, MHIS09, MASGHMNG19, Mc03, MWM05, MKSi16, MF05, MC04, Ng10, NLW16, hCN18, NDD14, OL08, OE19, Oro16, PP08, PP15, PSB19, PRW07, PD17, RH17, RL19]. Mathematics [RAL07, RA17, SCC19, SS18, SMG19, SMPK19, SAA18, SYOL07, SBN16, SF05, SS19, Sty08, SMZ06, TH19, Tay18, TCH17, TSP16, Ts06, TYC17, TLHV16a, TLHV16b, TS04, UD18, UFW17, VRFC10, Vidi15, VT07a, WM17, WH17, YnLLO8, YKKB19, YKUIB17, YT20, ZBL16, ZVV18, ZX20, ZF06, ATG13, AAF12, AV06, Am16, AW12, ALA15, Are12, Bag11, BHS15, Bay13, BW10, BC11, BK13a, BAV11, BK13b, Bur10, CGR13, CPMSW11, Cha10, CTG15, CK14, CL10, CCN12, Chel14, Chin12, Chi12b, CBT12, CME15, Cro09, DBS15, Ded15, Dk15, ELY15, EK09, FH13, Fos15, GCS10, GNO8, HCC15, HK11, HP11, HNB11, Hsi13, HW13, HIS16, HISH16, HFWY14, Ing14, KHL12, kaz14, KGA11, KG15, Kni10, KK16, KKvdW15, Kot10, KAC15, Las13, LY10]. Mathematics [Lee11, Li11, LP11, LHL09, LH16, Lin09, LM12, MW09, MS14, Mas15, MMK11, MODBB12, MP10, NFB15, NWD11, OO15, OS10, Owe14, PDG15, PV14, Pet13, PMSK12, RB13, RR11, RH11, RR11, RR09, Rut11, Sah10, Sap13, SIS11, SBN14, mS13, TSA12, TH15, VTCvS14, WLSL14, WOB12, WT13, WD12, WLC09, WMP12, Yan14, YL08, Yüük14, ZS11, ZL12, ZB13].
Moderating [TH18]. modern [Pap10]. Modes [ABPV20, AM04].
Most [BF19, HGSL18]. Mothers [Güv09]. Motion [Bay09, AAY15, EVV11, Fer14, Ful15]. Motivating [DP07, PCL18].
Motivation [BB09, CB16, FT05, FTWC18, HBP17, HHT+20, KWO07, KTC19, NIW16, hCN18, Oro16, PP15, AI18, ZL11, rSY19, CWW11,
ASR19, BB17, CCT16, DKL16, HSMO06, KL18a, Lee16b, LKC+15, hCN18, PN04, SLZZ20, SGCA18, YHL18, MAL+11]. Multiple-Choice [BB17]. multiplicative [TC09]. Multipliers [Dud17]. multivariable [MMR15].
museum [Chi04, MG15b]. my [FH12, KHL12].

N [VT07a]. naïve [CA14]. Nakuru [GN08]. Named [TLK17].
nanotechnology [BMN16]. National [Joh16, KYA13b, VT07b, BSA+14, ETL16, KYA13c, TOV12, TCC+10, VT07a, Mor09a, Mor09b]. Natural
[PTW05, WS16, AB11, BHSC16]. Naturalistic [NvKR+18, NKR+18]. Nature [APR+17, Das05, KP18, LOJ08, McC03, MBBR08, OL08, SAA18,
TSP16, AOC10, AB14, LCC+09, UKM11, Wai14]. necessarily [KHL12]. Need [GY19, LJ16, WT20, RCG+11]. needed [SWA+12]. negotiated
[Zio08]. Network [TWC+16]. neuroeducational [And14]. Neuroscience
[ALT14]. neurosciences [And14]. neuroscientific [LC14a, LC14b]. news
[Lin14a, Lin16b]. Newtonian [FB19]. Ninth [CC05, ES04, Shi18, UD18].
Ninth-Grader [ES04]. Non [Chi09, Dah17, JSS17, KTC19, MNBZH+05, WICC+18, AK13, Lin14a, Lin14b, Lin16b]. Non-Creative [Chi09].
non-immigrant [AK13]. Non-low [KTC19]. Non-math [WICC+18].
Non-math/Science [WICC+18]. Non-routine [JSS17]. non-science
[Li14a, Lin14b, Lin16b]. Nonlinear [AB18, LCA16, ST05, FH12].
Nonproportional [Ari19]. norms [LTT06, PK15]. Norwegian [Ped15].
NOS [AB14, HC16a]. NOSE [Das05]. Notebook [HILAT16]. Noticing
[Ama20, IFL20, Klil18, LLP19, YKKB19, Ama16, SMFL15].
Noticing-Oriented [LLP19]. Notion [KL18b, Par07, Kid11]. notions
[NN11]. Novel [HTCS19, Ama16, AB14, CMME15]. NSW [VC17].
Number [ABPD16, Als12, DGEP16, ERdDS20, LYC04, MOI07, PUR18,
Yan03, YuLL08, YRR09, HNB11]. Numbers
[GFCG18, ERdDS20, LTM18, Che12]. **Numeracies** [ZZ09]. **Numeracy** [GGD15a, DL12]. **Numerical** [ES09]. **Nursing** [DLD18]. **Nutrition** [CGERBL18]. **Nyanza** [Bag11].

**Object** [EA19]. **objects** [PMLC15]. **Observation** [KP18, TKS18]. **Observational** [PL15]. **observe** [KYA13a]. **Observing** [Sty08]. **Obstacle** [SVDK09]. **Obstacles** [Nis17, Mor09a, Mor09b]. **Occur** [RH19, TKS18]. **Obstacle** [SVDK09]. **Obstacles** [Nis17, Mor09a, Mor09b]. **Occur** [LH08].

**OECD** [YCH04]. **of-the-art** [HEB11]. **Oered** [Sty08]. **Oering** [SMG+19]. **Ocers** [SC03]. **official** [AV06]. **Old** [DAM19, NK04, MR14].

**olds** [BFE15, EVV11]. **Omani** [AAF17]. **One** [AVM16, Dud17, RL12]. **Online** [TSMW16, WC16, HTWT14]. **Open** [LNP+18, Zio08]. **Openness** [Yeol07a, Yeol07b]. **operation** [LS15]. **Operational** [AK17a, SG15].

**operation** [RHM+11]. **Operationalizing** [FD12]. **Opportunities** [And03, EH18, HKS18, jK19, SMZ06, ZKS+05, AE15, AE16, WT13].

**opportunity** [MRA10, ZC15]. **Optics** [MVC17a]. **optimal** [Cro09]. **Order** [Gub16]. **Organic** [HMS16, YY13, LT11]. **organiser** [GN08]. **organising** [KN13]. **organization** [CTGS15, Maj14].

**organizing** [KYA13a]. **orientation** [LHL+09, Ozdi10, RR16, Uit14]. **Orientational** [RH15]. **Orientations** [MAL+11, ZP06, RCG+11]. **Oriented** [LLP19, LLC+16, MNBZH+05, DMNH11, RVG15]. **origami** [AT15].

**origami-based** [AT15]. **Origin** [BBT17, Gov17]. **Origins** [BdSSC16].

**Orthodox** [EHM19]. **Our** [BC06, Owe14]. **Out-of-Field** [LR20, Hob13].

**out-of-school** [MMK11]. **Outcome** [JJC08, JLC08]. **Outcomes** [CC18, HE17, IAS17, Saf18, Saw19, TSC17, WK09, AM14b, GCS10, HP11, JLC+13, MAL+11, OBFI5, TOV12].

**outline** [RR09]. **outperform** [ZS11].

**Overcoming** [KBH+15, Ron18]. **overt** [AM14b]. **Overview** [Ran06].

**Ownership** [EN08, EGJ09]. **Oxidation** [Own06, Own10].

**Oxidation-reduction** [Own10].

**Pacific** [CABR06, TVC03]. **Pakistan** [Hal12]. **Palestinian** [Zei10, Zei15].

**Paper** [EK19, KAC15, RR09]. **paper-and-pencil** [KAC15]. **Papers** [An013, An012c, sL13, Tsa13].

**Papua** [PTW05]. **paradox** [DAO+11].

**Parental** [BFH19, SLZ20, SK17, Ing14]. **Part** [LRT+20, AH11].

**Participants** [HBP17]. **Participate** [HCH16]. **participating** [DRT+12].

**Participation** [ABPV20, Sas19, SJL20, Mor14, NWD11, RR11, RHM+11, RR09]. **particle** [BPG11, TCC+10]. **Particular** [KH06]. **Particulate** [CT18, AO10].

**partitioning** [BFE15, LS15]. **PARTSIM** [FL11]. **pathways** [NWD11].

**Pattern** [Wil20]. **Pattern** [KH06, LYC04, WL18, YY13]. **pb** [HCC15]. **PD** [MAL+11].

**Pedagogical**

**APR+17, CCW16, DRZ20, GCL18, GT19, Koh19, KBK15, LTM18, Leu05, LTCCY07, SBN16, Bra12, HEB11, Hsi13, Kön13, OL14, Rut11, SBN14].

**pedagogies** [NWD11]. **Pedagogy**

[DP07, KR18b, Leu19, PH19, Ale14, DFR06, KIR12, KB17].
Pedagogy-Embedded [DP07].
Peer [KH15, YKUB17, Gok12, Gok15, Kot10]. peers [ZS11]. pencil [KAC15].
people [RR11, RR09]. Perceived [AM04, HCH16, JLC+13, BK13a, Ing14, LCC11a].
Perception [AM04, HCH16, JLC+13, BK13a, Ing14, LCC11a].
Perceptions [AM04, HCH16, JLC+13, BK13a, Ing14, LCC11a].
Perceived [AM04, HCH16, JLC+13, BK13a, Ing14, LCC11a].
Periodicity [TSP16].
Periodic [FMOMG16].
Performance [AWL16, BG17, BHD+15, DJB15, ES09, HMS16, LLC+16, MMA05, PB09, AI18, SP05, TCH+17, Voy11, YnLL08, Yan19, YS19a, YKC18, ZG08, Can14, Gok15, LM15, Lin14b, Lin16b, OS10, RB13].
Periodic [FMOMG16].
Perception [Dog12, DJB15, Leu05, MKSK16, Sea16, Nar15, Tig14].
Perceptions [Dog12, DJB15, Leu05, MKSK16, Sea16, Nar15, Tig14].
Perspective [EA19, EGJ09, HY07, LL05, TC07, EDMA15, Hsi13, LL14, MS14, RVG15].
Perspective-Taking [EA19].
Perspectives [ALT14, BdSSC16, HMC19, YAC10, ZKS+05, ACY10, LG13, Owe14, SC14].
Ph [SYO07, KYA13a, PC13]. phase [DPK08]. Phases [GOMLS18]. PhD [VRFCT+08].
Phenomena [LH08, PTW05, AB11, Oh14]. phenomenon [GLY09].
Philosophy [MVC17a, MVC17b]. photoelectric [Oh11]. Photon [AKD+19].
Physics [AYLW16, AYLW16, PSO17, TKDD19, KHL12].
Physical [CT17, Gov17, SLC17, UE19, VT07b, WT18, MW09, VT07a].
Physics [AYLW16, AYLW16, AKD+19, BLS20, CT17, CC05, DAM19, EN08, EGJ09, EK18, FL06, Joh16, KH15, LE06, NHLS08, Nis17, TSMW16, TDW+17, TSP16, ZGZM17, BJ10, CWW11, EFL+13, EGN11, GS12, Gok12, KN13, KKvdW15, MA14, MR14, OBF15, PMSK+12, QM14, RR16, RHM+11, TDBLY16, Top13].
Physics-Related [AYLW16]. physiology [MIJJ15]. Piagetian [Bab10, NDD14].
Plain [Sch14]. Plain-English [Sch14]. plan [GDSD10, TT14].
positive [SWA+12]. Possibilities [TT14]. Possible [AO16, MSA17, LLT09, MPB10].
Problem-Solving [DGEP16, HCH16, Lil07, Gok15, KAC15, YFL15].

Problems [ASR19, Ari18, AB18, Chi09, ES09, EGJ09, HC16b, JLO18, KL18a, KAK+20, Koh19, LR08, Nis17, OC08, Ols18, SGCA18, Vid15, AC15, BZST10, BFE15, CY14, Din14, JC10, LLWS13, RVG15]. Procedural [ASR19]. procedurally [LM15]. Procedure [Gao20]. procedures [RVG15].


Qatari [QVST17, SWAEKS19]. Qualifications [VT07b, VT07a].

Qualitative [MSAGHMNG19, SD16, Hal12, YL08]. Qualities [FL06].

Quality [Bay13, HKS18, Law05, Yam18, YY13, BK13a, BJ10, Kaz14, Kni10, ZC15].

Qualitative [VT07b, VT07a].

Qualities [FL06].

Quality [Bay13, HKS18, Law05, Yam18, YY13, BK13a, BJ10, Kaz14, Kni10, ZC15].

Quantifying [BTY11]. Quantitative [O'C08].

Quantitative [O'C08].

Quantities [CT17, Par07, HNB11, LS15]. Quantization [AKD+19].

Question [KD09, DMNH11].

Questioning [BRMNH15, LLT+20, WHA14].

Questionnaire [ZVV18, Ded11, GGSP10, SCS+12]. Questions [HMS16, NVK+18, NKR+18, NPT17, UE19, NY11].


Reaction [Bay13, HKS18, Law05, Yam18, YY13, BK13a, BJ10, Kaz14, Kni10, ZC15].

Re- [CJOC11]. Re-engaging [CJOC11]. reaction [BZST10, LLWS13, PMLC15].


Readings [Ber19]. Real [ASR19, BLS20, GOMLS18, Jon19, SS18, CP12]. Real-world [ASR19, Jon19, CP12]. Realistic [RL19, CVCV11, SP15]. Realities [AV06]. reality [SLW10]. reasonable [AR10]. Reasonableness [Yan19, YS19a]. Reasoning [AD16, AB18, BBST06, DHB19, DWM16, Din18, DLD18, HMO9, JLO18, JSS17, Joh16, KR18a, KH06, LY07, Ols18, Sum13, Sum16a, Sum16b, VWH+17, YKUB17, AGB14, AH11, AT15, AE10, BES12, Bay13, CS15, FH12, GCK15, HNB11, LM15, LH14, NSV13, Per20, SW14].


Regard [AMG16, Gov17, KL18b, LSW19, Miy08, Bur10, Ded15, LG13, THV+15].

Region [TDBLY16]. Regional [TC07]. registers [DPK08, MMP14].

Regulated [CT04, FCS15, NHTLS08, YWC+18, AYLW16, HYC+16].

Regulation [LZL+18, POS17, TAC19, CC16, VAF12, YS19b]. Reification [Shi18]. Reinventing [Pap10]. rejection [GDD15b]. Related [AYLW16, Gür09, KR18a, LK18b, Nis17, PMCG+17, RH17, Sas19, TLHV16a, TLHV16b, YJY08, BW10, CSM12, CRR09, DC08, HWW13, JC10,
[ZGZM17]. Saharan [BLS20]. Same [RL19, Ron20, EE11]. Sample
[SP05, WK08]. Sampling [MSAGHMNG19, JLC+13]. Satisfaction
[AM04, WT20]. Saudi [AHO19, AAS13, Alg20, KA19, Tig14]. Savart
[Ma14]. Scaffold [IFL20]. Scaffolding
[BFH19, BWK+19, Ki18, MBF13, TWC+16, LHL+12]. Scaffolds
[CHC16, DK18]. Scale [BMD+17, Din18, Dud17, KR18b, Lin17, SWAEKS19,
TLk17, ZZV18, ALT+07, CCG+11, KBY11, NFK10, TSO16]. Scanpaths
Scholastic [TKS18]. School
[AVT16, AYLW16, AM04, Ari18, AK17b, AB18, ABG06, Bal18, CC18, DC16,
DB17, Din18, Dog16, Eng17, EkB19, GT19, Hl18, HBP17, HSul19, MSGGVZDF20,
JLO18, JMS16, KWO07, KB16a, KFM+17, LAN20, LE06, LFF03, LLW+20, Len06, LZL+18,
Lin04, LLC+16, LR08, MH17, MsdSGG17, MSAGHMNG19, MRDC17, MOI07, NLS08, Ng10,
hCN18, NPP16, PL15, PSB19, PTW05, RH17, RGC08, Sl18a, SP17, Sha06, Sl18b,
So03, Sun16a, Sun16b, TC07, TKDD19, TT18, TSP16, TYC17, TSC17, UM18, UF17,
VT07b, WT20, WO19, WS16, WHH08, YKC18, YKUB17, YCL04, ZZV18,
vV16, AAS13, Bag11, BK13a, BS15, CWW11, CTGS15, CK14, DBS15,
DMNH11, DJB15, EGN11, GN08, HBT13, HK10, Jac12, Kw13, LS14,
Lin14a, LTT09, LCC11b, MS14, MMK11, MIJJ15, MP10, MMZ09]. school
[MG15a, MLK+15, NY11, NN11, dFAN13, OdC15, ÖDC09, PPS12, PV14,
Ped15, QM14, RCT+11, RB13, RRW11, RGV15, Rut11, STC12, TBT+10,
TSO16, TRF05, Ut14, VT07a, Wai14, WP12, WT15, Wel15, Yan14].
School-Related [RH17, LS14]. Schooler [GD19, BSLM16]. Schooling
[WM17, MRA10]. Schools [DS18b, LFM+19, PP08, Saw19, BSA+14,
CBDV10, ETG16, Ful15, LP11, MR14, PZR16, SLW10, ZKS+05]. Sci
[LG18a, LG18b]. Science
[APR+17, AAAB16, AHO19, Alg20, AMG16, AD16, AAF17, ALT+07, ALT14,
AM04, Ano12a, Ano12b, ABH17, AO16, BdSS16, BE16, BG09, Bla04, Ble09,
BB19, CO18, CCCN17, CWLH19, Chi04, CYT16, CRR17, CMP19, Cor17,
CT04, DS18a, DC06, Das05, DE1MA15, FHL19, FHmL18, GS16, GC18,
GC19, GHS+18, Gil04, GPCB15, GSO+17, GHP07, GRWHP19, HSM06,
HTCS19, HmYB07, HNMGA16, HC16a, HFVH17, Hew04, HBP17, HY07,
Hua06, HC16b, HCH16, HILAT16, HL04, IAS17, IK18, Jaf20, Jia19, JLU+10,
KKA13b, KKE+17, KA19, KSE16, KUL18, KTC19, Ky106, LCA16, LF17,
LOJ08, LFF03, LL05, LLW+20, Ler07, LNZ+18, Lin14b, LLC+15, LLC+16,
LW16, LL17, LJC08, MNBZ+05, MHS09, MSA17, MDF08, MVC17a,
MVC17b, Mcc03, MP10, MG03, MWM05, MJ18, MBBR08, MS18, MKSK16].
Science
[MC04, MMA05, NLW16, OL08, OS05, PH19, PS017, PP08, PZA16, PB09,
Ran06, RGC08, RAL+07, Rol19, RV17, RH15, SBS+07, Sch14, SG09, Sea16,
Si18b, AI18, SCB16, So03, SZL18, SGHM15, SGHM16, SS19, SWAEKS19,
TWC+16, TAC19, TVC03, TC07, TYW+17, Tsa06, TYC17, TA15, TSC17,
VJ06, Vid15, VTV16, VT07b, WB20, WC16, WT18, WL18, WT20, Wat17,
WO19, WCS19, WS16, WSA07, WCG09, WCC +16, WIC +16, Yam18, YHL18, YKJ20, YWC +18, YS19b, YCH04, YT07, ZP06, rSY19, ATG13, Ale14, AAS13, AMBLL16, Are12, AK13, AM14b, AAY15, AB14, BTY11, BW10, BMN16, BAV +11, BNH +15, BMO14, Bur10, CA14, CCG +11, CY14, Che11, CCL15, Chi12a, CYK +16, CBO09, CJO11, DFR06, DAO +11, DRT +12, DK10, Ebr12, Em09, FG14, FD12, GCS10, GGD15b, science [Hal12, HCC15, HT13, Ho10, HTWT14, HEB11, HK10, HNB11, HpCh +16, HYC +16, HIS +16, HISH16, HL07, Hun14, IK14, Ing14, JLC08, JLC +13, KGA +11, KB16b, KYA13c, KYJS12, KBY11, Kni10, KV10, Kuw13, KB14, LAMV12, LCC11a, LHL +12, Lin14a, Lin16b, LH15, LC14a, LC14b, LS14, LM12, LLL15, MMK +11, Mel10, MDT13, MMZ09, MG15a, MG15b, Mor14, MPB10, NCH11, NRKR13, NEAC10, NFK10, NN11, Oli10, OEMZ12, PZLR16, PC13, RB13, RR11, RJHB12, RSPK14, RR09, Rut11, SC14, Sch15, SOTF13, SYO05, SYO17, SIS +11, SWA +12, SC11, mS13, So16, SLES09, TOV12, TSO16, Tig14, Tip10, TT14, TRF05, UKM11, VAF12, VRW05, VR12, VTO +12, WT15, WL14, YHT16, YL08, Zet15, ZKS +05, ZC15, ZB13, LAMV12, Lin16b]. science-based [FG14].

Science-Methods [Ble09, BL09]. Science-Oriented [MNBZH +05]. science-related [LS14]. science-text [YHT16]. Sciences [Gov17, SLC17]. Scientific [AD16, BWK +19, BE16, BMD +17, CS16, CC05, Das05, DWM16, Din18, Gov17, HCS18, HC18, KP18, LOJ08, Lee18, Lin16a, MSA17, TH18, VTV16, WB20, WSA07, WSW +08, Yam18, YPT07b, AB11, AB13, AMBLL16, BSLM16, ÇTC14, CS15, HS14, KR18a, LCC +09, MLK +15, NSV13, OBE12, SC14, SLES09, YZK15]. Scientist [Hsu19, Mor14, AB14, DW15]. Scientists [CC14, AB14, CTT +11, MVMJMR11]. scope [Rut11]. Scores [HILAT16, LM12]. Scripts [CC16]. sculpture [Nar15]. Search [PB19].

Second [PB09, Are12, Lin12]. Secondary [AC20, AHO19, ABPD16, BGE17, CGR17, EPEG07, FHM18, GHP07, HFVH17, HMS16, JSH +19, KWO07, KB16a, KA19, Kot16, Ku18, Len06, LR08, DG19, MBBR08, MRDC17, Ng10, OS05, PPS12, PP08, PTW05, PH18, PB09, SB17, Sum16a, Sum16b, TS20, TCH +17, VTO +1b, YTO7, AÔÇ10, Bag11, BS15, CWW11, CDT +11, Del15, ETG16, EGN11, FUL15, GN08, GM15b, HK10, KKV15, KV10, MD12, MG15a, NFB +15, Oh14, ODL15, PED15, QM14, RT10, SIS +11, Uit14, VTO7a, WP12, WT13, WD12, TBT +10].

Secondary-Tertiary [DG19]. sectors [BRMN15]. see [DL12]. seen [GLY09]. seismic [MV16]. Selected [ES04, ES09, WBB17, ZFC06, BAV +11]. selection [BHSC10]. Self [AYLW16, AO16, CC16, CT04, DC06, FCS15, Gao20, HBP17, LLW +20, LZZ +18, LJC08, MS18, NLS08, PSE17, SAF18, SC12, TAC19, TH18, WT20, YWC +18, YS19b, YTO7, Are12, Bag11, Bu10, CK14, Chi12a, HYC +16, JLC08, LM12, Pet13, Tig14, Uit14, VAF12]. Self-Concept [SC16, YTO7]. Self-concepts [HBP17, Are12]. Self-Diagnosis [SAF18]. Self-Efficacy [AO16, DC06, Gao20, LLW +20, LJC08, MS18, TH18, Bag11,
Bur10, CK14, JLC08, LM12, Pet13, Uit14]. **self-enhancement** [Chi12a]. **self-perception** [Tig14]. **Self-Regulated** [CT04, FCS15, NHI18, YWC18, AYLW16, HYC16]. **Self-Regulation** [LZL18, PS017, TAC19, CC16, YS19b, VAF12]. **Semantic** [WJ07]. **Semesters** [YHL18]. **Semiotic** [Chi12, Mas15, MMP14]. **Senior** [VC17, BSA14, LLT09, RCT11]. **Sense** [Bar17, GACZ09, NEAC10, WD12]. **sequencing** [BVDV13]. **SERI** [KKS19]. **series** [Rut11]. **Service** [Bay09, CT04, ELO08, Gub16, Jao17, KR18b, LTM18, WSW08, YZK15, YRR09, Ala16, ABPD16, AO16, Bil06, Bla04, CA07, CA14, DS15, DK15, DB17, GC19, GGD15b, HM09, IFL20, Jaf20, KIR12, Kil18, KLJ13, KB17, KN13, LHC17, Lin05b, NN11, PS19, Ron20, SMFL15, Tay18]. **SES** [CCN12]. **SES-different** [CCN12]. **setting** [Aky16, VRW05, ZB13]. **Settings** [LLC16]. **Sex** [DS18b, HNAA16, SCB16]. **Singapore** [Che14, Ful15, Kau11, TT07]. **Singaporean** [HWW13, JC10]. **Single** [DS18b, HNAA16, SCB16]. **Single-Sex** [DS18b, HNAA16, SCB16]. **Sink** [PMLC15]. **Sinking** [SLC17]. **sinks** [RSPK14]. **Situated** [DLD18]. **Situation** [Jao17, Shin [SYO07], Shoes [SS18], Shopping [SS18]]. **short** [HL16]. **Shortcomings** [KBH15]. **Should** [WB20, DCFC16]. **Signaling** [Jia19]. **Significance** [TLHV16a, TLHV16b]. **Silence** [GLY09]. **Simeulue** [BSA14]. **Similar** [HWV13]. **Similarities** [LFM19]. **Simple** [CK06, KEET17, Saf18, SY14, SBK14]. **Simulation** [DLD18]. **Simulation-Based** [DLD18]. **Singapore** [Che14, Ful15, Kau11, TT07]. **Singaporean** [HWW13, JC10]. **Single** [DS18b, HNAA16, SCB16]. **Single-Sex** [DS18b, HNAA16, SCB16]. **sink** [PMLC15]. **Sinking** [SLC17]. **sinks** [RSPK14]. **Situated** [DLD18]. **Situation** [Jao17, SP15, VTCvS14]. **Situations** [DJB15, Can14, Fos15, LS15]. **Six** [GHP07, SP05]. **Sixth** [EK19, SA16, YS19a, Als12, SY14]. **sixth-grade** [SY14]. **Size** [WH08]. **skill** [Chi12a]. **skill-development** [Chi12a]. **Skilled** [Lin16a]. **Skills** [AN18, CP17, DWM16, KD09, Kil18, KB15, Kul18, LSK18, PL15, WWLd15, YCH04, BVDV13, CYK16, DFR06, Ebr12, LM10, SLE09, Voy11, YFL15]. **Slope** [LF18, PMSK12]. **slopes** [MMR15]. **Small** [Bil06, Dud17, EN08, EGJ09, TVC03, TLK17, PK15]. **Small-Group** [EN08, EGJ09]. **Small-Scale** [Dud17, TLK17]. **soccer** [Lee11]. **Social** [CS16, HHT16, Ebr12, JLC13]. **Societal** [HEB11, YJY08]. **Society** [GSJ17]. **Socio** [KR18a, WB20, YZK15, EDMA15]. **socio-constructivist** [EDMA15]. **socio-demographic** [Las13]. **Socio-Scientific** [WB20, KR18a, YZK15]. **socioeconomic** [MP10]. **Sociomathematical** [PK15, LTT06]. **Socioscientific** [CYT16, CER17, FHL19, KKE17, KKL20, CT14, CYK16, LM10]. **Software** [Ols18, TYW17]. **Soils** [RL19]. **Solomon** [SC03]. **Solution** [CAC07, Lee16b, MSA17, CAC09]. **Solutions** [ASR19, AO16, JLO18, LNP18]. **Solve** [Dah17, RVG15]. **Solving**
[AD16, Ari18, DGEP16, EPEG07, FL06, GC19, HC16b, HCH16, JC17, JSS17, KC20, Li07, LR08, Lor05, Nis17, Ob18, PMCG+17, SCG+19, ST05, Bab10, BFE15, CVCV11, CY14, Gok15, JC10, JSP15, KAC15, LLWS13, LL14, SY14, SOTF13, SBK+14, Vor11, YFL15]. Some
[ES09, GOMLS18, SC03, TVC03, CRR09]. Sorting [Gao20]. Source
[KH08, Lin16a]. Sources [Gao20, MS18, WCC19, DRT+12]. South
[TC07, CABR06, Dud17, HK10, RR16, SBN14, SR09, SBN16, TVC03].

South [TC07, CABR06, Dud17, HK10, RR16, SBN14, SR09, SBN16, TVC03].

Southeastern [GGD15b]. Southern [Kaz14]. Space
[DK18, KLH15, GH15, GH16, UKM11]. speed [JC10]. spiral
[WLSC09]. Sports [SH18]. Square [Shi18]. Sri
[CEE12, Al18]. SSI
[KKL20]. SSI-COMM [KKL20]. SSynQs [HMS16]. stability [CdHD16].

staff [SYOL05, SYOL07]. Stages [TS04]. stakeholder [Web13]. stakes
[SWA+12]. Standard [MZC+19]. Standards
[WO19, Lee16a, NFK10, OS10]. Start [WwLD+15]. starting [KG15]. State
[HL04, HEB11, OLMZ12, TDBLY16, TCC+10]. Statements
[LP18, MRDCC17, YCL04]. States [Bar17, TVC03, TCC+10, ZF06].

Statewide [Saw19]. Statistical [LOJ08, LH15, TT18, WK08, CP12, LLT09].

Statistics [AK20, CCW16, Wat17, Yan14]. Status [KB16a, Kot16]. steam
[KB17, CC18, CMP19]. STEM [CCCN17, Saw19, HCC15, Ing14, BMD+17, BG17, BB19, Dah17, Eng17, EK19, GT19, GRWH19, HGS18, IAS17, JCC20, LFM+19, Leu19, PPB18, PZA16, P17, RG20, SI18a, Sis19, Saw19, SZC18, SSL+20, TKDD19, TM17, VCS20, VB20]. STEMMing [RG20].

stepwise [Gok15]. Stereoype [TPM19]. Stickers [KKE+17]. still [RT10].

Stoichiometry [HnB10, DC08]. stone [Nar15]. story [AM14a, HPP09].

Strategic [SCS+12, WHC17]. Strategies
[AT07, AOZ09, Ala16, ABP16, Ari18, FCS15, GD19, HmYB07, JCC20, Leu16b, LZL+18, PL19a, PSB19, TVC03, WSA07, YRR09, Als12, BC11, Ebr12, Gok15, Hal12, KAC15, LT11, Oh11, SBK+14]. Strategy
[LB08, CHB15, GN08]. strength [KYA13a]. Strengthening [Hsi13]. strengths [BSD13]. Stress [SMO06]. Stressful [SMO06]. Striving
[Lil07]. Strong [HTCS19]. Structural
[DGEP16, FCS15, JCC20, PMCG+17, JLC+13, PPS12, VAF12]. Structure
[CGR13, EA19, MSdSGG17, TWC+16, TYW+17, AM14b, Che11, KN13, LY13, NFB+15, Oli10, TSP12, WLSN14]. Structured [LB08, Can14].

Structures [EkB19, GLSM11, THV+15]. Structuring [CB16, Nis17]. struggles [AH11]. Student
[AT07, ASR19, AGBC17, AOZ09, AB11, AHO19, AYLW16, ALT+07, ABH17, AE15, AWL16, AB18, AOQ10, AKD+19, BWW+19, BB09, BI10, BCC06, BCC17].
CCW16, CdHD16, CS16, ČK06, CT18, Che12, CGR17, Cor18, DC06, DC16, DNV17, DAM19, DK18, DWM16, DRT+12, EN08, EK18, EG17, FB19, FTWC18, FH12, GSO+17, HbK19, HmYB07, HE17, HKS18, HGS18, HMA16, Hsu19, HLT18, HCH16, IAS17, IK18, IFL20, JC17, JLO18, JSS17, JCC20, JHW16, JSH+19, Jon19, KR18a, KAK+20, KWO07, KYA13b, KA19, jK19, KKL20, KČ18, KH06, Kul18, LCA16, LE06, LSW19, LL06, LFF03, Lee16b, Lee18, LLW+20, Len06, LTCCY07, Lin04, Lin16a, LLC+16, LL17, Lin17, Liu05, LR08, LH08, MH17, MSA17, MSdSGG17, MKSK16, MRDCC17, Ng10, NLW16, hCN18, NFB+15, NK04, OS05, Oro16, OBH17].

Student
PS017, PP08, PP15, PZA16, PUR18, PN04, PTW05, PRW+07, PCL18, PD17, PB09, RSPK14, SL18a, Saw19, Sch14, SMPK+19, SLC17, SCSK19, SLCK19, SA16, SZCL18, SJL20, SF05, Su08, SWEKS19, Sum16a, THAD20, TT07, TH19, TAC19, TBP17, Tay18, TCH+17, UFW17, VR05, Vid15, Wan07, WL08, WC16, WT18, WT20, WK09, Wil20, YHL18, YS19a, YKC18, YS19b, YCH04, YT07, YCL04, YY13, YJY08, vV16, ARZRV16, AAMU+14, AR10, AM14a, AW12, AE16, APCK12, BZST10, Bag11, BHS15, BS15, ÇCA09, ÇTC14, CSM12, CPMSW11, CW11, CK14, CDT+11, CYK+16, CBVD10, DC08, DBS15, DFR06, DMNH11, Ebr12, ES16, GS12, GN08, Gok12, Gok15, GS13, HBTP13, HCC15, HL13, Ing14, JLCT12, KAYA13a, KST09, KB16b, KYA13c, KKvdW15, Kuw13, LM15, Lep12, Lin06, LHL+09, Lin14b, Lin16b].

Student-Centered [MH17]. Student-led [BB09]. Student-teacher [BB09]. Student-with-GeoGebra [JC17].

Studies
ERC03, GHP07, LSW19, DNV15, HMA16, Hsu19, HYC+16, SLES09, WCY16, YL08].

Study
APR+17, BFH19, Ber19, BBT17, BC05, CT17, CABR06, CT04, DNV17, Gao20, GG09, GWHP19, HNMGA16, Jia19, JHW16, KAYA13b, KLI18b, KRU19, KH06, LSW19, LB08, NKR+18, Oro16, PPB18, PZA16, PN04, PRW+07, QVST17, Sap13, SMPK+19, SA16, TSMW16, TLH16a, TLH16b, VC17, WB20, Wan07, WL08, Yan03, YuLL08, YHL18, YKB19,
YYC04, YCH04, ALA +15, AB14, BSA +14, BPG11, BW10, BC11, ÇTC14, Cha10, CL10, CCN +12, DW15, DRT +12, EDS10, ETG16, FD12, HFYW14, HY05, JC10, Kau11, KAYA13c, KYSJ12, KK16, LCC +09, LLI09, LCC11b, ME13, MMP14, MR14, OS10, OdC15, ÖDC09, PZL16, PV14, PMLC15, RJB12, RL12, RT10, Rut11, So16, Tan11, TOV12, TDBLY16, Top13, TCC +10, VTCvS14, Yan14, YHT16, ZS11, vA06, NvKR +18. Studying [Saf18, TRF05, SY14].


T [VT07a]. Tables [Sha06]. Tacit [FB06]. Tacit-explicit [FB06]. Taiwan [CLY10, CCN +12, HL13, JLC08, KAYA13b, Kaya13c, Las13, LCC +16, LJC08, WT15, WO19, WICC +18, Yan03, YRR09, ZBL +16]. Taiwanese [AMBLL16, CT18, Chi12b, Hsi13, HWW13, HPC16, HY05, JLC12, JLC +13, LY10, Lee18, LW16, Liu05, WL18, WT20, Yan14, YCL04]. Taking [EA19]. talented [LG13]. Talk [LLC +15, LJC +16, MG10, THAD20, TA15, KHL12]. Talk-Moves [THAD20]. Talking [EGJ09, CC14, Kot10]. Task [GD19, JSS17, KJ19, LK18a, PL19b]. Tasks [AWL16, BB19, CJ17, Dah17, Hew04, LLP19, MAA05, PSB19, PN18, Ron18, RH19, Tay18, TT18, Yeo17a, Yeo17b, ZG08, Bab10, Bay13, Bes11a, Bes11b, EVV11, LM15, SY14]. tasks* [Lin06]. taught [DCFC16, EE11, MMZ09]. Taxonomy [WO19]. Teach [AO16, WM19, IK14]. Teacher [AVM16, APR +17, AHO19, AMG16, Ama20, AAF17, Ari18, Ari19, AK20, AO16, Bal18, BE16, Bla04, BKC15, BHD +15, CW06, ÇAC07, CCW16, CO18, Chi04, CCR17, Cor18, Cor17, CT04, DBHB19, DB17, DNWC18, DJB15, EKB19, ES08, FT19, GCl18, GC19, Gov17, HSM006, HNAA16, HC16a, HFV17, HKS18, HCBS18, HCI18, MSGGVZF20, IAS17, IK18, IFL20,
JLO18, Jaf20, Jao17, KBH+15, KL18a, KB16a, Kil18, KKE+17, KLJ+13, KA19, jK19, KLH15, Koh19, KBK15, LNP+18, LAN20, LR20, LSW19, LFF03, LL05, LLP19, LL20, LTM18, LTCCY07, LSK18, LW16, LJC08, Li18, LK18b, MHS09, MSAGHMNG19, ModBB12, McG03, MW05, MBBR08, MKSK16, MMA05, MOI07, NKR+18, NPT17, Nyi15, OÇ08, PSO17, PL19a, PUR18, PL19b, PN04, RAL+07, RH15, RH19, SCG+19, SMG+19, Sea16].

**Teacher** [SAA18, SJL20, SMZ06, Sum16a, Sum16b, THAD20, TBP17, Tay18, TC07, TCH+17, TKDD19, TA15, WM17, WJ07, WCC19, WHH08, WHC17, WICC+18, YZK15, Yam18, YKUIB17, YS19b, ZZ16, ZV18, rSY19, AV06, AH11, AAMU+14, AAS13, Ama16, AW12, Bag11, BB09, BW10, BSD13, BK13b, Bur10, ÇTC14, CGR13, Cha10, CVCCV11, CCN+12, CBO09, DS15, Ded15, DW15, EE11, ELY15, EDMA15, Eme09, GLY09, HTB13, H13, HK10, JLC08, Jac12, KHL12, KGA+11, KB17, Ko10, Kôn13, KN13, KSE16, KB14, Las13, Leci16a, LG13, Li11, LCC+09, Lin06, LCC11a, Lin14a, MNE12, ME13, MJJ15, MG15a, MG15b, Mor14, NY11, NN11, OBF15, Olı10, Ols07, OEM12, QM14, RRW11, RL12, RCG+11, SMFL15, Sap13, SC14, TBT+10, TDBLY16, Top13, VTCvS14, Wai14, WMS13, Yan14].

**Teacher-Directed** [SJL20].

**teacher-generated** [NY11].

**teacher-researchers** [KB14].

**Teachers** [AAAB16, Ala16, ABPD16, AD16, AM04, Bay09, BB19, ÇP17, Che08, Dog16, DKL16, EH18, ERC03, ELO08, GPCB15, Gub16, HTCS19, HM09, HCBZ03, HL04, KR18b, Kot14, LHC17, LTT+19, Lin05b, Lin16a, Lin17, MDF08, MS18, OE19, PP08, PSB19, Ron20, SC03, Sty08, TYC17, WSA07, WSW+08, WICC+18, YRR09, YKKB19, BW10, BK13a, BAV+11, CA14, CKH15, CMME15, DFRO6, Ded11, DK15, ELY15, GGD15b, HWI13, KST09, KIR12, KBY11, KAC15, LCC11a, Maj14, OS10, Oh14, RRW11, WT13, ZKS+05].

**Teaching** [AOZ09, APR+17, AAAB16, AAF17, AK17b, BLS20, BdSSC16, Bla04, CW06, CO18, CCCN17, CP12, Cli09, CMP19, CT04, Dud17, EH18, GGD15a, HNMG16, HNA16, HE17, HM09, HFV17, H13, HSM16, Jao17, JLC17, KWO07, KB16a, KLH15, KBK15, LL05, LP11, Lin05b, LW16, LL17, LJC08, LI18, MCV17b, McG03, MBBR08, MS18, PL19a, PYR+12, Ran06, RH15, SS18, SMPK+19, SG09, SLES09, SLZ+18, TSMW16, TKDD19, VCSW20, WL08, WCC19, WICC+18, YZK15, Yan10, ATG13, AV06, Aky16, AAMU+14, AAS13, BPG11, BEF15, BK13a, BMN16, Bur10, CBO09, Ded15, DW15, EGN11, EK09, FD12, HBTP13, Hal12, HK10, HWI13, JLC08, JLU+10, KG15, KJ13, KN13, MW09, Maj14, ME13, MS14, NRKR13, NAC10, QM14, Sap13, SC14, TRF05].

**technical** [Per20].

**technique** [KYA13a].

**techniques** [LH15, Pap10].

**Techno** [JC17, wdWB17].

**Techno-Mathematical** [JC17, vdWB17].

**Technological** [Koh19, YYJ08, Aky16, DS15, GCK15].

**Technologies** [GGD15a, RGC08, Su08, ZZ09].

**Technology** [ALT14, BC05, ÇP17, CCCN17, CT04, DRFR06, EB20, HCH16, JC17, LW16, Ng19, SC03, Wai14, WHH08, WCG09, HCC15, HIS+16, HISH16, KAC15, RSPK14, SIS+11, VB20].

**Technology-Aided** [ÇP17].

**Technology-Enhanced** [ALT14].
REFERENCES


REFERENCES


Al-Balushi:2013:RBL


Aydeniz:2014:WDS


Ayan:2018:MSS


Azaiza:2006:LEE


Atwood-Blaine:2017:MGS


Almeida:2016:SNS


Andra:2020:FFM


Almudi:2015:AAC


Aguilar:2020:FAR


Anderson:2010:FCP

REFERENCES


REFERENCES


**Adu-Gyamfi:2017:SCB**


**Akkus:2011:ETS**


**Albadi:2019:RRS**


**Areepattamannil:2013:FPS**


**Asghari:2017:MAO**

Amir H. Asghari and Leyla G. Khosroshahi. Making associativity operational. *International Journal of Science...
REFERENCES


REFERENCES


[AM14a] Rebecca Ambrose and Marta Molina. Spanish/English bilingual students’ comprehension of arithmetic story prob-


REFERENCES


REFERENCES

2003. CODEN ????. ISSN 1571-0068 (print), 1573-1774 (electronic).


Aydeniz:2012:ASC


Akerson:2017:EUL


Alajmi:2010:EEG


Areepattamannil:2012:FSG


Arican:2018:PMH

[Ari18] Muhammet Arican. Preservice middle and high school mathematics teachers’ strategies when solving proportion


Aslan-Tutak:2015:EOB


Abrams:2013:CCR


Aydin:2015:TAD


Agudelo-Valderrama:2006:GGB


Agudelo-Valderrama:2016:PCW

REFERENCES


REFERENCES


[Babai:2006:IIP] Reuven Babai, Tali Brecher, Ruth Stavy, and Dina Tirosh. Intuitive interference in probabilistic reasoning. *Internation-


REFERENCES


[BF19] Laura Bofferding and Sherri Farmer. Most and least: Differences in integer comparisons based on temperature comparison language. *International Journal of Science and Mathematics Education*, 17(3):545–563, March 2019. CODEN ???? ISSN 1571-0068 (print), 1573-1774 (elec-
REFERENCES


REFERENCES


[BL09] Robert E. Bleicher and Joan S. Lindgren. Erratum: Variable relationships among different science learners in elementary science-methods courses. *International Journal of Science
REFERENCES


REFERENCES


[BWK+19] Brian R. Belland, D. Mark Weiss, Nam Ju Kim, Jacob Pi-
land, and Jiangyue Gu. An examination of credit recovery
students’ use of computer-based scaffolding in a problem-
based, scientific inquiry unit. *International Journal of Sci-
ence and Mathematics Education*, 17(2):273–293, February
2019. CODEN ???? ISSN 1571-0068 (print), 1573-1774
10.1007/s10763-017-9872-9.

[BZST10] Reuven Babai, Hanna Zilber, Ruth Stavy, and Dina Tiros.
The effect of intervention on accuracy of students’ responses
and reaction times to geometry problems. *International
Journal of Science and Mathematics Education*, 8(1):185–
201, February 2010. CODEN ???? ISSN 1571-0068 (print),

[CA14] Erdat Cataloglu and Salih Ates. The effects of cogni-
tive styles on naïve impetus theory application degrees of
pre-service science teachers. *International Journal of Sci-
ence and Mathematics Education*, 12(4):699–719, August
2014. CODEN ???? ISSN 1571-0068 (print), 1573-1774

[CABR06] Richard Kevin Coll, Sadaquat Ali, John Bonato, and David
Rohindra. Investigating first-year chemistry learning diffi-
culties in the South Pacific: A case study from Fiji. *Inter-
national Journal of Science and Mathematics Education*, 4
(3):365–390, November 2006. CODEN ???? ISSN 1571-

[ÇAC07] Muamner Çalik, Alipaşa Ayas, and Richard Kevin Coll. En-
hancing pre-service elementary teachers’ conceptual under-
standing of solution chemistry with conceptual change text.
*International Journal of Science and Mathematics Educa-
tion*, 5(1):1–28, March 2007. CODEN ???? ISSN 1571-


Michael P. Clough, Craig A. Berg, and Joanne K. Olson. Promoting effective science teacher education and science teaching: a framework for teacher decision-making. *International
REFERENCES


Cole:2012:AMM


Chang:2005:DA


Chen:2014:STS


Chen:2016:CSE


Briana L. Chang, Jennifer G. Cromley, and Nhi Tran. Coordinating multiple representations in a reform calcu-
REFERENCES


REFERENCES


REFERENCES


REFERENCES


[Cepni:2006:TSC]


[Cheema:2014:IDC]


[Choi:2015:SDI]


[Chen:2010:ICC]

REFERENCES


REFERENCES


[CT04] Gerry Corrigan and Neil Taylor. An exploratory study of the effect a self-regulated learning environment has on pre-


REFERENCES


**Changeiywo:2011:ISM**


**Chen:2014:PRB**


**Chung:2016:ESC**


**Chin:2016:ASC**

REFERENCES


[DB17] Esra Demiray and Mine Işiksal Bostan. An investigation of pre-service middle school mathematics teachers’ abil-

**Davis:2015:WDU**


**Dalgety:2006:EFY**


**Dahsah:2008:TGS**


**Dankenbring:2016:EES**


Nhalevilo:2013:RHI


Dawson:2006:ICT


Martino:2019:MCS


Deliyianni:2016:RFP


REFERENCES

Duchhardt:2017:AUM


Dolin:2010:RCP


Delice:2015:IRF


Delen:2018:SSE


Dreher:2016:WUM


[DNWC18] Phuntsho Dolma, David Nutche, James J. Watters, and Vinesh Chandra. Investigating the alignment of Bhutanese

**Dogan:2012:ECP**


**Dogbey:2016:UVS**


**Dana-Picard:2007:MCP**


**Dana-Picard:2008:EPS**


**Dionne:2012:SSM**

[DRT+12] Liliane Dionne, Giuliano Reis, Louis Trudel, Gabriel Guillet, Leonard Kleine, and Corina Hancianu. Students’ sources of

**Delgado-Rebolledo:2020:RBK**


**Daher:2015:PST**


**Daher:2018:DPC**


**Dhindsa:2018:ADP**


Edsand:2020:IEE


Ebrahim:2012:ECL


El-Deghaidy:2015:STT


Edmondston:2010:SPC

REFERENCES


96

Elia:2009:GAA


Erickson:2018:WTC


Ehrenfeld:2019:IIC


Even:2009:ATM


Eshach:2018:UPE

REFERENCES


Emrullah Erdem. Erratum to: Mental computation: Evidence from fifth graders. *International Journal of Science
REFERENCES


Erdem:2017:MCE


IJSME-76590009

ERdDS20


Edwards:2004:RAS


Escudero:2008:MTP


Emepue:2009:CAF

Nicholas Emepue and Kola Soyibo. Correlations among five demographic variables and the performance of selected Jamaican 11th-graders on some numerical problems on energy.
Emden:2016:ASE

Emilov:2016:CNS

Ebersbach:2011:KAM

Frade:2006:TED

Fazio:2019:CUN
Claudio Fazio and Onofrio R. Battaglia. Conceptual understanding of Newtonian mechanics through cluster anal-


REFERENCES


REFERENCES


Friege:2006:TQK


Fies:2011:BWM


Franco-Mariscal:2016:UIC


Foster:2015:EUS


Feng:2005:UAM

[FT05] Sung-Lin Feng and Hsiao-Lin Tuan. Using ARCS model to promote 11th graders’ motivation and achievement in learn-
REFERENCES


Garcia-Carmona:2019:PSP


Gomez-Chacon:2015:SGW


Garcia-Carmona:2018:PPT


Gilleece:2010:EMS


Gomez:2019:MSB

REFERENCES

Goldston:2010:PAL


Gomezescobar:2018:NSI


Goodchild:2009:ESM


Geiger:2015:RDT


Glaze:2015:ESU

REFERENCES


REFERENCES

Georgiou:2012:USU


Grootenboer:2013:RIS


Gandara:2016:UGG


Gravemeijer:2017:WME


Gougis:2017:PSS

Rebekka Darner Gougis, Janet F. Stomberg, Alicia T. O’Hare, Catherine M. O’Reilly, Nicholas E. Bader, Thomas

[Gardner:2019:IIS]

[Guberman:2016:DAT]

[Guven:2009:FRP]

[Ge:2019:DWN]
REFERENCES


REFERENCES


Herman:2016:TLN


Huang:2016:GDE


Hwang:2018:CDT


Hofstein:2003:DLA


Han:2015:HST

[HCC15] Sunyoung Han, Robert Capraro, and Mary Margaret Capraro. How science, technology, engineering, and math-
REFERENCES


Huang:2016:RAS


Hwang:2018:DTI


Ng:2018:HSS


Hatisaru:2017:MKT

Hofstein:2011:SIT


Hewson:2004:RSL


Herman:2017:FPR


Hu:2014:CSI


Hemmings:2011:PMA

Brian Hemmings, Peter Grootenboer, and Russell Kay. Predicting mathematics achievement: the influence of prior achievement and attitudes. *International Journal of Science and Mathematics Education*, 9(3):691–705, June 2011. CODEN ????? ISSN 1571-0068 (print), 1573-1774 (elec-
REFERENCES

Holmes:2018:IAS

Hong:2020:ESD

Hilton:2018:EPS

Huerta:2016:RBL

Hsu:2016:EIS
Ying-Shao Hsu, Paola Iannone, Hsiao-Ching She, Allyson F. Hadwin, and Larry D. Yore. Epilogue for the ijsme spe-
REFERENCES

117


REFERENCES


[Hughes:2019:EVU] Elizabeth M. Hughes, Andrew M. Markelz, and Lauren E. Cozad. Evaluating various undergraduate perspectives of

**Hrin:2016:ESS**


**Hand:2007:UWL**


**Haroun:2016:GDT**


**Howe:2011:RNP**

REFERENCES


REFERENCES


REFERENCES


REFERENCES


Kim:2019:TLO


Jack:2008:TET


Jen:2013:PSR


Jones:2017:TIH


Jack:2012:MCG


**JLO18**  

**Juuti:2010:STM**  

**Ju:2016:HMK**  

**Johansson:2016:MRR**  
REFERENCES


Kazima:2014:UBE


Kyei-Blankson:2014:TMS


Khakasa:2016:STP


Khishfe:2016:LSC


Kim:2017:AKE

[KB17] Dongryeul Kim and Molly Bolger. Analysis of Korean elementary pre-service teachers’ changing attitudes about integrated steam pedagogy through developing lesson plans.
REFERENCES


Svetlana Kerenxhi and Pranvera Gjoci. Dual treatments as starting point for integrative perceptions in teaching mathematics. *International Journal of Science and Mathematics Education*, 13(4):793–809, August 2015. CODEN ???. ISSN 1571-0068 (print), 1573-1774 (electron...
 REFERENCES


Raimo Kaasila, Markku S. Hannula, and Anu Laine. “My personal relationship towards mathematics has necessarily


**REFERENCES**


REFERENCES


Kazemi:2018:DSM


Kim:2011:CGE


Kosiol:2019:WMI


Kukliansky:2016:STV


Kariotoglou:2009:HST


REFERENCES


REFERENCES


REFERENCES


[Leng:2006:EA] Ng Wee Leng. Effects of an Ancient Chinese mathematics enrichment programme on secondary school students’

**Leppavirta:2012:AUS**


**Lerman:2004:E**


**Lerman:2007:DLR**


**Leu:2005:EPM**


**Leung:2019:ESP**

Lamb:2017:AME

Lingefjaard:2018:ES

Lee:2003:TSI

Lesseig:2019:ACI

Levenson:2013:ITP
Esther Levenson and Hagar Gal. Insights from a teacher professional development course: rona’s changing perspectives


REFERENCES

Lofgren:2008:FYS


Lee:2014:RBF


Liou:2015:STU


Lin:2016:DAC


Leavy:2017:EIR

Aisling Leavy, Mairead Hourigan, and Claire Carroll. Exploring the impact of reform mathematics on entry-level pre-
REFERENCES


REFERENCES


**Lin:2005:E**


**Lin:2005:URB**


**Lin:2005:E**


**Lins:2005:E**


**Lin:2006:CTU**


**Lin:2012:ETS**

Lin:2014:EST


Lin:2014:SNS


Lin:2016:DSE


Lin:2016:ESN

Lindvall:2017:TLS


Liu:2005:MHE


Liu:2009:HPD


Larkin:2016:HMW


Liu:2008:TET

REFERENCES


[LL06] Reuven Lazarowitz and Carl Lieb. Formative assessment pre-test to identify college students’ prior knowledge, mis-


[LLC+15] Sheau-Wen Lin, Yu Liu, Shin-Feng Chen, Jing-Ru Wang, and Huey-Lien Kao. Development of a computer-based mea-


REFERENCES


[LM12] Rachel A. Louis and Jean M. Mistele. The differences in scores and self-efficacy by student gender in mathematics

[Lai:2015:HKG]

[Laine:2018:CPT]

[Lawson:2008:CSM]

[Lorenzo:2005:DIE]
REFERENCES

Lim:2011:TMT


Llinares:2008:SSS


Lane:2020:FMT


Lin:2014:EIS


Lee:2015:DPO

REFERENCES


[LTCCY07] Suat Khoh Lim-Teo, Kwee Gek Chua, Wai Kwong Cheang, and Joseph K. Yeo. The development of diploma in education student teachers’ mathematics pedagogical content knowledge. *International Journal of Science and Mathematics Edu-
REFERENCES

Lemonidis:2018:STC

Levenson:2006:MPB

Leong:2019:CST

Luitel:2013:MIP
REFERENCES


REFERENCES


REFERENCES


Mintzes:2004:UCC


McComas:2003:TCN


McGinnis:2003:CSM


Martin-Dunlop:2008:LEA


Middleton:2013:CCR

REFERENCES


REFERENCES


Miyazaki:2008:CIS


Medina-Jerez:2018:SER


Medina-Jerez:2011:UDC


Mikk:2016:RBS


Mun:2015:CCC

Kongju Mun, Hyunju Lee, Sung-Won Kim, Kyunghee Choi, Sung-Youn Choi, and Joseph S. Krajcik. Cross-cultural comparison of perceptions on the global scientific literacy with


REFERENCES


[MNE12] Rachel Mamlok-Naaman and Ingo Eilks. Different types of action research to promote chemistry teachers’ professional development — a joined theoretical reflection on two cases from Israel and Germany. *International Journal of Science and Mathematics Education*, 10(3):581–610, June
REFERENCES


Milford:2010:OBU


Molina:2017:SSS


So:2013:CMP


Martinez-Sierra:2014:GMT


Menon:2018:SST

Deepika Menon and Troy D. Sadler. Sources of science teaching self-efficacy for preservice elementary teachers in science content courses. *International Journal of Science
REFERENCES

Marshall:2017:IBI


Martinez-Sierra:2019:DEE


Martinez-Sierra:2017:SEH


IJSME-77060005


[Mauricio:2017:DSE]


[Mauricio:2017:TLS]


[Madsen:2009:RBT]

J. Randy McGinnis, Tad Watanabe, and Amy Roth McDuffie. University mathematics and science faculty modeling their understanding of reform based instruction in a teacher preparation program: Voices of faculty and teacher candidates. *International Journal of Science and Math-
REFERENCES

Mason:2019:RIC

Naresh:2015:SSI

Nam:2011:ISW

Norton:2014:MMB

Narjaikaew:2010:MTS
Pattawan Narjaikaew, Narumon Emarat, Kwan Arayathanitkul, and Bronwen Cowie. Magnetism teaching sequences based on an inductive approach for first-year Thai
REFERENCES


REFERENCES


REFERENCES


REFERENCES


[Nyb] Canan Nakiboğlu and H. Esra Yıldırı̈m. Analysis of Turkish high school chemistry textbooks and teacher-generated


[OÇ08] John Olive and Günhan Çağlayan. Learners’ difficulties with quantitative units in algebraic word problems and the

**Ozmen:2009:CSE**


**Oliva:2015:CML**


**Ouertatani:2007:ABA**


**Olsher:2019:OTS**

Otto:2012:UST


Oh:2011:UEC


Oh:2014:UA


Oehrtman:2008:CSM


Osman:2014:IIM

REFERENCES


REFERENCES


[Own06] Zangyuan Own. The application of an adaptive Web-based learning environment on oxidation-reduction reactions. *International Journal of Science and Mathematics Education*,....
REFERENCES


REFERENCES


[PL19a] Mimi Park and Eun-Jung Lee. Korean preservice elementary teachers’ abilities to identify equiprobability bias and


Patterson:2004:CST


Pettersen:2018:ICD


Panizzon:2008:APE


Pantziara:2015:SMM


Papadopoulos:2019:WTW


Laura J. Pyzdrowski, Ye Sun, Reagan Curtis, David Miller, Gary Winn, and Robin A. M. Hensel. Readiness and atti-


Pimthong:2012:TLA


Pasha-Zaidi:2016:GSE


Paige:2016:RES


Qhobela:2014:ESS


Qureshi:2017:IBC

Sheila Qureshi, Venkat Rao Vishnumolakala, Daniel C. Southam, and David F. Treagust. Inquiry-based chemistry


[Reid-Griffin:2008:UPR] Angelia Reid-Griffin and Glenda Carter. Uncovering the potential: The role of technologies on science learning
REFERENCES

- Ruhrig:2015:CST

- Rach:2017:TSU

- Russo:2019:TPS

- Reiss:2011:UPR


Umesh Dewnarain Ramnarain and Sam Ramaila. The achievement goals orientation of South African first year


Ruthven:2011:UIS


Romance:2017:ICS


Roorda:2015:AOT


Rau:2016:CPC


Sisman:2016:SSG

Gulcin Tan Sisman and Meral Aksu. A study on sixth grade students’ misconceptions and errors in spatial measurement:


Scantlebury:2007:AIG


Stavy:2006:IRU


Sade:2003:TTE


Smith:2011:WTI

[SC11] Emma Smith and Sandra Cooke. ‘i was told it was going to be hard work but i wasn’t told it was going to be this much work’: the experiences and aspirations of undergraduate science students. *International Journal of Science and Mathematics Education*, 9(2):303–326, April 2011. CODEN ????. ISSN 1571-0068 (print), 1573-1774 (electronic). URL http://link.springer.com/article/10.1007/s10763-010-9228-1.

Sarkar:2014:BST

REFERENCES


Bruce M. Shore, Tanya Chichekian, Cassidy A. Syer, Mark W. Aulls, and Carl H. Frederiksen. Planning, enactment, and reflection in inquiry-based learning: validating the

Shin:2019:IUC


Saglam:2016:QRE


Seah:2016:ETP


Spinner:2005:EIM


Schur:2009:TJN

REFERENCES


Sharma:2006:HSS

Shinno:2018:RLS

Shymansky:2003:E

Shirley:2011:PIC

Sormunen:2020:MCP
REFERENCES


REFERENCES


Scheiner:2019:WMM


Scherer-Meyer:2019:FLP


Sullivan:2006:TAM


So:2003:LST


So:2016:RPE

Winnie W. M. So. Representational practices in extracurricular science inquiry projects: a study with Asian primary pupils. *International Journal of Science and


Carly Sawatzki and Peter Sullivan. Shopping for shoes: Teaching students to apply and interpret mathematics in
REFERENCES


**Stoffelsma:2019:RBE**


**Stamovlasis:2005:CVP**


**Sia:2012:HSS**


**Styliandies:2008:IGO**

REFERENCES


Antti Savinainen and Jouni Viiri. The force concept inventory as a measure of students conceptual coherence. *International Journal of Science and Mathematics Education*, 6
REFERENCES


Skordoulis:2009:SCO


Sodervik:2015:CUP


Sutopo:2014:IRA


Shymansky:2012:HMP


Summers:2019:CLS

Ryan Summers, Shuai Wang, Fouad Abd-El-Khalick, and Ziad Said. Comparing Likert scale functionality across cul-
REFERENCES


[So:2018:ASA] Winnie Wing Mui So, Ying Zhan, Stephen Cheuk Fai Chow, and Chi Fai Leung. Analysis of STEM activities in pri-

[Tytler:2015:ETD]


[Tas:2019:EDB]


[Tang:2011:RCC]


[Taylan:2018:RBP]


[Taskin:2017:STK]

Vahide Taskin, Sascha Bernholt, and Ilka Parchmann. Student teachers’ knowledge about chemical representations. In-


REFERENCES


REFERENCES


Tippett:2017:FPK


Topcu:2013:PTE


Tao:2012:LTO


Taasoobshirazi:2019:STG


Treagust:2004:E

REFERENCES


Georgios Tsitsipis, Dimitrios Stamovlasis, and George Papageorgiou. A probabilistic model for students’ errors and


REFERENCES


Ubuz:2019:EPM


Uribé-Florez:2017:MUE


Uitto:2014:IAS


Urhahne:2011:CNS


Uchida:2018:DTF

Akitoshi Uchida and Kazuo Mori. Detection and treatment of fake math — dislikes among Japanese junior high
REFERENCES


REFERENCES


Barend Vlaardingerbroek and T. G. Neil Taylor. Upper secondary school physical science curricula in New Zealand

Verhoef:2014:CLS


Vieira:2016:FSL


vanVelzen:2016:EGH


Vale:2017:MVC

Waight:2014:TKH


Wang:2004:DVT


Wang:2007:STA


Watson:2017:LSS


Wan:2020:WMS

REFERENCES


Wong:2016:ACD


Watson:2012:LCM


Webb:2013:XIK


Weldeana:2015:GPH


Wright:2016:BTP

Katherine Landau Wright, Amanda D. Franks, Li-Jen Kuo, Erin M. McTigue, and Jiniva Serrano. Both theory and prac-

**WFPC04**


**WHA14**


**Wu:2017:BMT**


**WHH08**


**Wilkie:2020:ISA**

Karina J. Wilkie. Investigating students' attention to covariation features of their constructed graphs in a figural


REFERENCES


[WS16] Michelle P. Whitacre and E. Wendy Saul. High school girls’ interpretations of science graphs: Exploring complex...

[Wiebe:2007:EES]


[Wilhelm:2008:EPS]


[Wang:2013:POL]


[Wang:2015:DTS]

REFERENCES


**Yaman:2018:ESW**


**Yang:2003:TLN**


**Yang:2014:EST**


**Yang:2019:PFG**


**Yip:2004:HKS**

Din Yan Yip, Ming Ming Chiu, and Esther Sui Chu Ho. Hong Kong student achievement in OECD-PISA study: Gender
REFERENCES


Yang:2019:PNM


Yemen-Karpuzcu:2017:PMS


Yore:2008:MQR


Yang:2018:FAR


Yang:2008:SPG

Der-Ching Yang, Mao neng Li, and Chih-I Lin. A study of the performance of 5th graders in number sense and its

Yore:2007:IA


Yore:2007:LCM


Yang:2009:NSS


Yang:2019:SGS


Yerdelen:2019:MIS


[YS19b]
**REFERENCES**


REFERENCES


[ZBL+16] Qiaoping Zhang, Tasos Barkatsas, Huk-Yuen Law, Yuh-Chyn Leu, Wee Tiong Senh, and Ngai-Ying Wong. What primary students in the Chinese Mainland, Hong Kong and Tai-

**Zhang:2015:EIT**


**Zeidan:2010:RBG**


**Zeidan:2015:CLE**


**Zhu:2006:FRP**

REFERENCES


REFERENCES


[ZX20] Baichang Zhong and Liying Xia. A systematic review on exploring the potential of educational robotics in mathematics education. *International Journal of Science and
REFERENCES

