

Date	Name	Domain	Focus	Keyword	Task Types	Metrics	Models	Citation
2020-09-07	MMLU (Mas- sive Multitask Language Under- standing)	Multidomain	Academic knowledge and reason- ing across 57 subjects	multitask, multiple-choice, zero-shot, few- shot, knowledge probing	Multiple choice	Accuracy	GPT-4o, Gem- ini 1.5 Pro, o1, DeepSeek-R1	[1] ⇒
2023-11-20	GPQA Diamond	Science	Graduate- level scientific reasoning	Google-proof, graduate-level, science QA, chem- istry, physics	Multiple choice, Multi- step QA	Accuracy	o1, DeepSeek- R1	[2] ⇒
2018-03-14	ARC-Challenge (Advanced Reason- ing Challenge)	Science	Grade-school science with reasoning emphasis	grade-school, sci- ence QA, challenge set, reasoning	Multiple choice	Accuracy	GPT-4, Claude	[3] ⇒
2025-01-24	Humanity’s Last Exam	Multidomain	Broad cross- domain aca- demic reason- ing	cross-domain, academic exam, multiple-choice, multidisciplinary	Multiple choice	Accuracy		[4] ⇒
2024-11-07	FrontierMath	Mathematics	Challenging advanced mathematical reasoning	symbolic reason- ing, number theory, algebraic geometry, category theory	Problem solving	Accuracy		[5] ⇒
2024-07-18	SciCode	Scientific Pro- gramming	Scientific code generation and problem solving	code synthesis, scientific comput- ing, programming benchmark	Coding	Solve rate ( percent)	Claude3.5- Sonnet	[6] ⇒
2025-03-13	AIME (Ameri- can Invitational Mathematics Examination)	Mathematics	Pre-college advanced prob- lem solving	algebra, combina- torics, number the- ory, geometry	Problem solving	Accuracy		[7] ⇒
2025-02-15	MATH-500	Mathematics	Math reason- ing generaliza- tion	calculus, algebra, number theory, ge- ometry	Problem solving	Accuracy		[8] ⇒
2024-04-02	CURIE (Scientific Long-Context Un- derstanding, Reason- ing and Infor- mation Extraction)	Multidomain Science	Long-context scientific rea- soning	long-context, infor- mation extraction, multimodal	Information extrac- tion, Reasoning, Concept tracking, Aggregation, Algebraic manipulation, Multi- modal comprehension	Accuracy		[9] ⇒
2023-01-26	FEABench (Finite Element Analysis Benchmark)	Computational Engineering	FEA simula- tion accuracy and perfor- mance	finite element, sim- ulation, PDE	Simulation, Perfor- mance evaluation	Solve time, Er- ror norm	FEniCS, deal.II	[10] ⇒

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2024-07-12	SPIQA (Scientific Paper Image Question Answering)	Computer Science	Multimodal QA on scientific figures	multimodal QA, figure understanding, table comprehension, chain-of-thought	Question answering, Multimodal QA, Chain-of-Thought evaluation	Accuracy, F1 score	Chain-of-Thought models, Multimodal QA systems	[11] ⇒
2020-09-28	MedQA	Medical Question Answering	Medical board exam QA	USMLE, diagnostic QA, medical knowledge, multilingual	Multiple choice	Accuracy	Neural reader, Retrieval-based QA systems	[12] ⇒
2025-05-13	BaisBench (Biological AI Scientist Benchmark)	Computational Biology	Omics-driven AI research tasks	single-cell annotation, biological QA, autonomous discovery	Cell type annotation, Multiple choice	Annotation accuracy, QA accuracy	LLM-based AI scientist agents	[13] ⇒
2023-01-26	MOLGEN	Computational Chemistry	Molecular generation and optimization	SELFIES, GAN, property optimization	Distribution learning, Goal-oriented generation	Validity percent, Novelty percent, QED, Docking score	MolGen	[14] ⇒
2020-05-02	Open Graph Benchmark (OGB) - Biology	Graph ML	Biological graph property prediction	node prediction, link prediction, graph classification	Node property prediction, Link property prediction, Graph property prediction	Accuracy, ROC-AUC	GCN, GraphSAGE, GAT	[15] ⇒
2011-10-01	Materials Project	Materials Science	DFT-based property prediction	DFT, materials genome, high-throughput	Property prediction	MAE, R <sup>2</sup>	Automatminer, Crystal Graph Neural Networks	[16] ⇒
2020-10-20	OCP (Open Catalyst Project)	Chemistry; Materials Science	Catalyst adsorption energy prediction	DFT relaxations, adsorption energy, graph neural networks	Energy prediction, Force prediction	MAE (energy), MAE (force)	CGCNN, SchNet, DimeNet++, GemNet-OC	[17]–[20] ⇒
2023-06-20	JARVIS-Leaderboard	Materials Science; Benchmarking	Comparative evaluation of materials design methods	leaderboards, materials methods, simulation	Method benchmarking, Leaderboard ranking	MAE, RMSE, Accuracy		[21] ⇒
2022-02-22	Quantum Computing Benchmarks (QML)	Quantum Computing	Quantum algorithm performance evaluation	quantum circuits, state preparation, error correction	Circuit benchmarking, State classification	Fidelity, Success probability	IBM Q, IonQ, AQT@LBNL	[22] ⇒
2024-10-01	CFDBench (Fluid Dynamics)	Fluid Dynamics; Scientific ML	Neural operator surrogate modeling	neural operators, CFD, FNO, DeepONet	Surrogate modeling	L2 error, MAE	FNO, DeepONet, U-Net	[23] ⇒
None	SatImgNet	Remote Sensing	Satellite imagery classification	land-use, zero-shot, multi-task	Image classification	Accuracy		[24] ⇒
2023-07-19	ClimateLearn	Climate Science; Forecasting	ML for weather and climate modeling	medium-range forecasting, ERA5, data-driven	Forecasting	RMSE, Anomaly correlation	CNN baselines, ResNet variants	[25] ⇒

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2022-06-09	BIG-Bench (Beyond the Imitation Game Benchmark)	NLP; AI Evaluation	Diverse reasoning and generalization tasks	few-shot, multi-task, bias analysis	Few-shot evaluation, Multi-task evaluation	Accuracy, Task-specific metrics	GPT-3, Dense Transformers, Sparse Transformers	[26] ⇒
2019-11-20	CommonSenseQA	NLP; Commonsense	Commonsense question answering	ConceptNet, multiple-choice, adversarial	Multiple choice	Accuracy	BERT-large, RoBERTa, GPT-3	[27] ⇒
2019-07-24	Winogrande	NLP; Commonsense	Winograd Schema-style pronoun resolution	adversarial, pronoun resolution	Pronoun resolution	Accuracy, AUC	RoBERTa, BERT, GPT-2	[28] ⇒

## References

- [1] D. Hendrycks, C. Burns, S. Kadavath, *et al.*, “Measuring massive multitask language understanding,” *arXiv preprint arXiv:2009.03300*, 2021. [Online]. Available: <https://arxiv.org/abs/2009.03300>.
- [2] D. Rein, B. L. Hou, A. C. Stickland, *et al.*, *Gpqa: A graduate-level google-proof q and a benchmark*, 2023. [Online]. Available: <https://arxiv.org/abs/2311.12022>.
- [3] P. Clark, I. Cowhey, O. Etzioni, *et al.*, “Think you have solved question answering? try arc, the ai2 reasoning challenge,” in *EMNLP 2018*, 2018, pp. 237–248. [Online]. Available: <https://allenai.org/data/arc>.
- [4] L. Phan, A. Gatti, Z. Han, *et al.*, *Humanity’s last exam*, 2025. [Online]. Available: <https://arxiv.org/abs/2501.14249>.
- [5] E. Glazer, E. Erdil, T. Besiroglu, *et al.*, *Frontiermath: A benchmark for evaluating advanced mathematical reasoning in ai*, 2024. [Online]. Available: <https://arxiv.org/abs/2411.04872>.
- [6] M. Tian, L. Gao, S. Zhang, *et al.*, *Scicode: A research coding benchmark curated by scientists*, 2024. [Online]. Available: <https://arxiv.org/abs/2407.13168>.
- [7] TBD, *Aime*, [Online accessed 2025-06-24], Mar. 2025. [Online]. Available: <https://www.vals.ai/benchmarks/aime-2025-03-13>.
- [8] HuggingFaceH4, *Math-500*, 2025. [Online]. Available: <https://huggingface.co/datasets/HuggingFaceH4/MATH-500>.
- [9] T. A. authors, *Scientific reasoning benchmarks from the curie dataset*, 2024. [Online]. Available: <https://arxiv.org/abs/2404.02029>.
- [10] A. Institute, *Feabench: A finite element analysis benchmark*, 2023. [Online]. Available: <https://github.com/alleninstitute/feabench>.
- [11] X. Zhong, Y. Gao, and S. Gururangan, “Spiqa: Scientific paper image question answering,” 2024. [Online]. Available: <https://arxiv.org/abs/2407.09413>.
- [12] D. Jin, Y. Li, Y. Zhang, *et al.*, “What disease does this patient have? a large-scale open-domain question answering dataset from medical exams,” 2020. [Online]. Available: <https://arxiv.org/abs/2009.13081>.
- [13] E. Luo, J. Jia, Y. Xiong, *et al.*, *Benchmarking ai scientists in omics data-driven biological research*, 2025. [Online]. Available: <https://arxiv.org/abs/2505.08341>.
- [14] Y. Fang, N. Zhang, Z. Chen, *et al.*, “Domain-agnostic molecular generation with chemical feedback,” 2023. [Online]. Available: <https://arxiv.org/abs/2301.11259>.
- [15] W. Hu, M. Fey, M. Zitnik, *et al.*, *Open graph benchmark: Datasets for machine learning on graphs*, 2020. [Online]. Available: <https://arxiv.org/abs/2005.00687>.
- [16] A. Jain, S. P. Ong, G. Hautier, *et al.*, “The materials project: A materials genome approach,” *APL Materials*, vol. 1, no. 1, 2013. DOI: 10.1063/1.4812323. [Online]. Available: <https://materialsproject.org/>.
- [17] L. Chamussot, A. Das, S. Goyal, *et al.*, “The open catalyst 2020 (oc20) dataset and community challenges,” *ACS Catalysis*, vol. 11, no. 10, pp. 6059–6072, 2021. DOI: 10.1021/acscatal.0c04525. [Online]. Available: <https://pubs.acs.org/doi/10.1021/acscatal.0c04525>.
- [18] R. Tran, J. Lan, M. Shuaibi, *et al.*, “The open catalyst 2022 (oc22) dataset and challenges for oxide electrocatalysts,” *ACS Catalysis*, vol. 13, no. 5, pp. 3066–3084, 2023. DOI: 10.1021/acscatal.2c05426. [Online]. Available: <https://pubs.acs.org/doi/10.1021/acscatal.2c05426>.
- [19] L. Chamussot, A. Das, S. Goyal, *et al.*, “Open catalyst 2020 (oc20) dataset and community challenges,” *ACS Catalysis*, vol. 11, no. 10, pp. 6059–6072, 2021. DOI: 10.1021/acscatal.0c04525. eprint: <https://doi.org/10.1021/acscatal.0c04525>. [Online]. Available: <https://doi.org/10.1021/acscatal.0c04525>.

- [20] R. Tran, J. r. .- c. n. Lan, M. Shuaibi, *et al.*, “The open catalyst 2022 (oc22) dataset and challenges for oxide electrocatalysts,” *ACS Catalysis*, vol. 13, no. 5, pp. 3066–3084, Feb. 2023, ISSN: 2155-5435. DOI: 10.1021/acscatal.2c05426. [Online]. Available: <http://dx.doi.org/10.1021/acscatal.2c05426>.
- [21] K. Choudhary, D. Wines, K. Li, *et al.*, “JARVIS-Leaderboard: A large scale benchmark of materials design methods,” *npj Computational Materials*, vol. 10, no. 1, p. 93, 2024. DOI: 10.1038/s41524-024-01259-w. [Online]. Available: <https://doi.org/10.1038/s41524-024-01259-w>.
- [22] F. J. Kiwit, M. Marso, P. Ross, C. A. Riofrío, J. Klepsch, and A. Luckow, “Application-oriented benchmarking of quantum generative learning using quark,” in *2023 IEEE International Conference on Quantum Computing and Engineering (QCE)*, IEEE, Sep. 2023, pp. 475–484. DOI: 10.1109/qce57702.2023.00061. [Online]. Available: <http://dx.doi.org/10.1109/QCE57702.2023.00061>.
- [23] Y. Luo, Y. Chen, and Z. Zhang, *Cfdbench: A large-scale benchmark for machine learning methods in fluid dynamics*, 2024. [Online]. Available: <https://arxiv.org/abs/2310.05963>.
- [24] J. Roberts, K. Han, and S. Albanie, *Satin: A multi-task metadataset for classifying satellite imagery using vision-language models*, 2023. arXiv: 2304.11619 [cs.CV]. [Online]. Available: <https://arxiv.org/abs/2304.11619>.
- [25] T. Nguyen, J. Jewik, H. Bansal, P. Sharma, and A. Grover, *Climatelearn: Benchmarking machine learning for weather and climate modeling*, 2023. arXiv: 2307.01909 [cs.LG]. [Online]. Available: <https://arxiv.org/abs/2307.01909>.
- [26] A. Srivastava, A. Rastogi, A. Rao, *et al.*, *Beyond the imitation game: Quantifying and extrapolating the capabilities of language models*, 2023. arXiv: 2206.04615 [cs.CL]. [Online]. Available: <https://arxiv.org/abs/2206.04615>.
- [27] A. Talmor, J. Herzig, N. Lourie, and J. Berant, *Commonsenseqa: A question answering challenge targeting commonsense knowledge*, 2019. arXiv: 1811.00937 [cs.CL]. [Online]. Available: <https://arxiv.org/abs/1811.00937>.
- [28] K. Sakaguchi, R. L. Bras, C. Bhagavatula, and Y. Choi, *Winogrande: An adversarial winograd schema challenge at scale*, 2019. arXiv: 1907.10641 [cs.CL]. [Online]. Available: <https://arxiv.org/abs/1907.10641>.